

**DAHLGREN DIVISION
NAVAL SURFACE WARFARE CENTER**

Dahlgren, Virginia 22448-5100



NSWCDD/MP-97/121

**A CASE STUDY IN CRADA AND
LICENSE PROCESSES**

**BY THOMAS A. DELGUIDICE AND JOSEPH C. MONOLO
WEAPONS SYSTEMS DEPARTMENT**

**JAMES B. BECHTEL, ESQ.
ASSOCIATE COUNSEL (INTELLECTUAL PROPERTY)**

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FOREWORD

This publication presents the Shoulder-Launched Multipurpose Assault Weapon (SMAW) Cooperative Research and Development Agreement (CRADA) and License experiences as a case study for the education of anyone considering a similar endeavor.

The CRADA Guidebook, NSWCDD/MP-95/215, by Ramsey D. Johnson and Navy Standard CRADA are recommended as other resources.

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This publication was reviewed by Joseph C. Monolo, Head, Light Weapons Branch.

Approved by:

A handwritten signature in black ink, appearing to read "Thomas Tschirn", written in a cursive style.

THOMAS N. TSCHIRN, Head,
Guns and Munitions Division

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INTRODUCTION

PURPOSE

This document presents the processes used to realize a return on the government's investment in the Shoulder-Launched Multipurpose Assault Weapon (SMAW) Cooperative Research and Development Agreement (CRADA) and Licenses. This document provides a historical description of the events and provide "lessons learned" for anyone seeking to follow a similar course of action.

BACKGROUND

The SMAW was developed by the Naval Surface Warfare Center, Dahlgren Division (NSWCDD), Dahlgren, Virginia to a requirement established by the United States Marine Corps (USMC). The weapon system consists of a warhead, rocket motor, launcher, and spotting rifle. The dual mode warhead was developed at NSWCDD in the late 70's with initial studies for a launcher in the early 80's. To the maximum extent possible, off-the-shelf (OTS) items were used to develop the system, which was comprised of a rocket motor and launch tube from the Israeli B-300 system and a spotting rifle from Royal Arms. It took approximately 20 mo for the system, known as the Mk 153 Mod 0, to be completed for the USMC, with deliveries in the 1984-85 time frame.

A USMC Product Improvement Program (PIP) was started at NSWCDD in FY88 and a new launcher and family of rounds was in the making. After reviewing different concepts of an electrical version and a mechanical version, a lithium battery-powered electrical version of the SMAW launcher was chosen for the first build. In FY92, one prototype electrical version of the SMAW launcher was completed. The mechanical version was on the drawing board in FY92, but due to funding problems the USMC canceled the program and a prototype of the mechanical version was never built.

In 1994, engineers from NSWCDD began collaborating with the technical staff at CMS Inc. (CMS) through a CRADA between the parties to complete a mechanical version, the Mk 153 Mod 1. CMS will provide several prototypes and a collaborative effort of NSWCDD and the USMC will complete the design and operational testing as defined in the CRADA. This agreement provides cooperative beneficial research and development on the SMAW system. The CRADA will enable future investments in SMAW improvements. The CRADA provided the necessary background cooperation to allow the parties to negotiate the patent license that was signed on 14 March 1997.

PATENTS

BACKGROUND

U.S. patent laws are based on a clause in Article 1, Section 8 of our Constitution which invests Congress with the power to enact the necessary legislation for the protection of inventions and the works of authors. That clause reads thusly:

The Congress shall have power...To promote the Progress of Science and useful Arts, by securing for limited times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.

The current patent law was enacted in 1952 and has been amended many times since. It is contained in Title 35 of the U.S. code. Executive Branch agencies, such as the Department of the Navy, have been in the practice of filing patent applications made by Navy military or civilian personnel since at least World War II. Currently, section 207 of Title 35 gives this power to the Navy. Executive Order 10096 of January 1950, as amended, established a basic patent policy with respect to inventions made by government employees and requires the government to acquire title to inventions made under certain conditions. The NSWCDD Patent Counsel, among other things, maintains records of, and conducts investigations into, discoveries made by Dahlgren personnel and files and prosecutes patent applications where warranted.

BASIC CONCEPTS

Before a patent can be granted on an invention, an application for patent must be filed in the U.S. Patent Office. Section 101 of Title 35 specifies the general fields of subject matter that can be patented in a utility application (...whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement therefore,...) And Section 171 authorizes design patents (... whoever invents any new, original and ornamental design for an article of manufacture....) for articles whose outward appearance is new and distinct from other articles of a similar kind. These two types of patent applications, utility and design, were chosen by Patent Counsel to ensure the best coverage as possible of all SMAW inventions.

As stated above, Section 101 says, "...whoever invents or discovers..." may obtain a patent therefore. It has been found over the years, and after many court decisions, that defining the act of inventing is more difficult than might first be supposed. An invention is the result of an inventive act; it consists of a mental operation involving conception of an idea and a physical operation involving reduction of the idea to practice. Therefore, it can be seen that mere conception of an idea, by itself, is not enough. There must also be a reduction to practice to show how the invention is constructed and how it works. However, this reduction to practice can come about in one of two ways: an actual reduction to practice, such as by building a prototype or model, or a constructive reduction to practice such as by filing a patent application that complies with the law. According to Section 112 of Title 35, this is done when the application "...contains a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art, ..., to make and use the same..." and "...concludes with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as the invention...." Of course, writing the claims for an application is done by the patent attorney, but it is the responsibility of the inventor to provide a complete technical description of the invention that enables the requirement for a written description to be satisfied.

Once an application is filed, an examination is made by one of the patent examiners particularly knowledgeable in that field. The examination, after ensuring that the application form complies with all of the rules, must ensure three conditions are met before a patent will be granted. Those conditions are 1) novelty, 2) usefulness, and 3) nonobviousness. The examiner is responsible for researching all U.S. and foreign patents (also called the "prior art") in the same field before making a determination that the invention is novel. The term "useful" as used in the statute means that the invention must serve a useful purpose or must be operative. Finally, a patent will not be granted on an invention even though the invention may be new, if the differences between the invention and the prior art are such that the subject matter as a whole would have been

obvious to a person having ordinary skill in that art. This last condition generally means that small advances, such as substitution of one material for another or changing size of parts, are not patentable.

Under recent changes made in the law, a U.S. patent, once issued, is in force for 20 yr from the filing date as long as maintenance fees are paid periodically to the Patent Office to maintain the patent. These functions of arranging for the payment of filing fees and issue fees and maintenance fees are also completed by the Office of Patent Counsel. Once a patent issues, Section 271 of Title 35 says that "...whoever without authority makes, uses, offers to sell or sells any patented invention ... infringes the patent." By licensing the SMAW inventions to CMS, the Navy transfers this technology to the commercial world, gains revenue from the sale of products using these inventions and allows CMS to make and sell these inventions without committing patent infringement.

SMAW INVENTIONS

An FY91 NSWCDD study of the contractor-developed Mk 153 Mod 0 Launcher highlighted numerous problems that the user encountered in the field and identified specific poorly designed features that led to each of those problems. Although the response could have been to address each feature, by itself, and find a specific solution to the problem, that did not happen. A Dahlgren team conceived a new design, referred to as the Mod 1, which eliminated all of the identified problems as well as bringing in new capabilities. Patent Counsel's role, at this point, was to help identify each improvement and make sure a completed Invention Disclosure had been submitted. With the philosophy that "more is better" in mind, it was decided to pursue patent coverage, not only for each separate invention, but also for the new combination of the individual ones. This led to the preparation and filing of applications for the inventions shown in Table 1.

TABLE 1. SMAW INVENTIONS

	Navy Case No.	Title
1	77069	Detachable Tube for Shoulder-Fired Weapon
2	77068	Improved Sighting Device for Shoulder-Fired Weapon
3	77067	Improved Locking Mechanism for Shoulder-Fired Weapon
4	76394	Single Spring Ball Lock and Position Ejector
5	77066	Electronic Firing Circuit
6	76395	Spotting Axis Bore Alignment Mechanism
7	76393	Single Spring Ball Lock and Position Detent
8	76463	Dual Firing Mechanism
9	76464	Insensitive Munitions Warhead Case
10	77070	Anti Tip-Off Device
11	77064	Tri-Mode Fuze
12	76392	Ammunition Cartridge with Reduced Propellant Charge
13	77065	High-Explosive Follow-Through
14	77072	Improved Shoulder-Fired Weapon (utility)
15	77071	Improved Shoulder-Fired Weapon (design)

This approach was taken with the idea in mind that a strong, complete patent portfolio protects a product—in this case, the weapon system, by claiming as many new features as possible. It is not necessary to review any of these inventions specifically in any more detail because it is very difficult to explain in a paper such as this why each new component of a new design was selected and because most of the design details are still undergoing finalization and may have small changes made. However, suffice it to say that an awful lot of creativity was involved.

There were, in this case, two patent applications on a new warhead design that had been filed many years earlier but were being held under secrecy orders. It became obvious during negotiations with CMS that it would make any weapon system they would produce much more valuable if the system incorporated this new warhead design. The USMC determined that the underlying technology could be declassified and helped accomplish that end. Then, Patent Counsel petitioned the Patent Office to lift each secrecy order and allow the patents to be issued. These two patents were added to the portfolio made available to CMS.

Some of the advantages that Patent Counsel had to work with, in this area, include the following:

(1) being close, in time, to when the engineering work was completed, which meant that when further explanations were needed for particular details, that the inventors had current knowledge;

(2) finding that an actual prototype of the Mod 1 had been built, which meant that engineering-quality drawings existed;

(3) strong support from Department management; and

(4) an existing CRADA between Dahlgren and CMS, which meant outside viewpoints on specifically what design changes would make the Mod 1 commercially valuable. This last point was conceivably one of the main reasons CMS saw advantages to proceeding to negotiations on the patent license.

The design for the Mk 153 Mod 1 SMAW Launcher was entirely a NSWCDD effort. As a result, all inventions belong to the Government. Under the CRADA, CMS provided assistance through manufacture of prototypes and performance of qualification testing (Table 2). This may not be the case for future work because the terms of the CRADA allow either partner to be a contributing member for new inventions.

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRADA)

CRADA BACKGROUND

Government-operated federal laboratories, such as NSWCDD are permitted to enter into CRADAs under the Stevenson-Wydler Technology Innovation Act of 1980, as amended by subsequent laws and Executive Order 12591, "Facilitating Access To Science and Technology". CRADAs are permitted with other federal laboratories, state or local governments, universities, and the private sector.

The Department of Defense (DoD) Domestic Technology Transfer Program Regulation, DoD 3200.12-R-4, 27 December 1988, SECNAV Instruction 5700.16, 27 October 1989, and the Office of Naval Research (ONR) Instruction 5700.1 of 24 July 1991 issue this authority and provide policy and guidance for Department of Navy (DON) components. The ONR has published a Navy CRADA handbook that explains the process used in the Navy.

CRADA HIGHLIGHTS

A CRADA is an agreement between one or more federal laboratories and one or more non-federal parties to perform cooperative and mutually beneficial Research and Development (R&D).

Under a CRADA, NSWCDD can provide personnel, services, facilities, equipment, or other resources (except funding to non-federal parties), with or without reimbursement.

Non-federal parties may provide funds, personnel, services, facilities, equipment, or other resources for the conduct of specified research or development efforts.

A CRADA is not a procurement contract and is not governed by the FAR and DFARS.

CRADA BENEFITS

A CRADA provides "technology leveraging" which is a means of utilizing non-DON resources to support DoD sponsorship of promising technologies to accelerate their development.

A CRADA may provide "industrial growth" by enhancing economic competitiveness for non-federal parties.

A CRADA should be "quick and simple," (i.e., a legal document that can be easily understood and quickly approved).

CRADA REQUIREMENTS

R&D conducted under a CRADA must be consistent with the mission of NSWCDD.

The NSWCDD Commander has approval authority for standard NSWCDD CRADAs.

The Office of Counsel of NSWCDD conducts a legal review of each proposed CRADA for compliance with the law and appropriate conflict of interest statutes, among other things.

A non-standard CRADA is subject to ONR review within a statutory thirty- (30) day period after CRADA approval.

CRADAs need not be competitive; however, it is strongly recommended that multiple potential sources be considered to the extent practicable before selecting a CRADA partner and negotiating specific terms. The intent is to obtain the best partner for DON and avoid any partiality.

CRADAs may not be used to limit competition among sources in any subsequent procurement in the same area.

CRADA objectives should be mutually beneficial to and protect the interest of all parties to the agreement. CRADAs should be prepared with technical, legal, and management support from all parties.

GENERAL PROCEDURE

In general, the subject-matter and principal purposes of the four prevalent categories of DON CRADAs are as follows: (a) co-developing and marketing a product, (b) co-developing and/or modifying and marketing software, (c) using DON facilities to the mutual benefit of both parties, and (d) supplying funds for mutually beneficial R&D to be performed by NSWCDD.

In the Agreement Procedures at NSWCDD there are three key offices for CRADA development and execution. The offices are Office of Counsel, the Technology Transfer Office, and the CRADA Coordination Office.

When there is interest by either a Dahlgren technical office or an outside party, the first step to start the CRADA process is that the main technical office start a file and open correspondence between the parties. As per miscellaneous publication (MP)-95/215, a CRADA guide book specific to Dahlgren, the CRADA proposal form and the CRADA questionnaire should be completed by the partners and submitted to the CRADA Coordination Office. These forms are included in the MP.

STANDARD CRADA (AKA S-CRADA)

As with other Navy technology transfer processes, the S-CRADA has general rules that must be followed. Dahlgren personnel working with these types of agreements should become familiar with these rules because all parties to an agreement must reach an "informal" agreement that these rules will be sufficient for their purposes. If the parties cannot operate under the following rules, then the type of agreement that is considered next is a non-standard CRADA, discussed below. In general, the S-CRADA rules are as follows:

- The S-CRADA format and wording is used without modification;
- The S-CRADA may be used with only one non-Navy partner; not a consortium;
- The non-Navy partner must be a U. S. entity (i.e., a private company, state or local governments, public or private foundations or nonprofit organizations, including universities, and may not be a venture capitalist nor directly or indirectly controlled by a foreign company or government;
- The S-CRADA must have a written legal review;
- The non-Navy partner may not provide more than \$500,000 to the Navy partner over the life of the S-CRADA;
- The Navy partner may not expend more than
- The S-CRADA life should not be planned for more than three (3) years; and
- The S-CRADA is not used for an agreement with an intermediary or technology "broker" for technology transfer or patent licenses.

NON-STANDARD CRADA

In a general sense, the usual way parties wanting to enter into some type of CRADA agreement proceed is to look at the format for the S-CRADA and try to reach agreement thereunder. This is good for a couple of reasons: (1) it causes the parties to prepare a Statement of Work that describes in some detail exactly what it is that they want to accomplish, and (2) it makes each side identify areas where they wonder whether the S-CRADA will suffice. If the partners reach agreement that the S-CRADA will not serve their interests, because of one or more of the procedural rules for using the S-CRADA, they should then turn to the concept of the non-standard CRADA. The Commander, NSWCDD, must get preapproval to sign a non-standard CRADA from the Chief of Naval Research, and this will usually take some amount of time because of the negotiations over wording that will take place.

Unlike the S-CRADA, above, there are only a few general rules that must be followed when the partners agree to go forward with a non-standard CRADA. First, there must be a very good reason why the non-standard format is to be used. This format will take more time to complete, and therefore, in our busy life, will need more resources. Second, the agreement must still have a written legal review. Third, the format of the final document will still very closely resemble that of an S-CRADA, and even the wording will be almost exactly the same, with only a few changes. Finally, all concerned should remember that a CRADA is an agreement that will benefit both partners. Approval will not be given when only the non-federal partner benefits.

SMAW CRADA

The SMAW CRADA between CMS and NSWCDD is a non-standard CRADA. The SMAW CRADA did not satisfy the criteria of a S-CRADA because CMS is foreign-owned and the term of the CRADA is longer than 3 yr.

TABLE 2. SMAW CRADA RESPONSIBILITIES

NSWCDD	CMS
Complete Design and Drawings	Production
Technical Advice to Marketing	Test and Evaluation
Technical Advice to Production	Future SMAW Improvements
Future SMAW Improvements	Funding to NSWCDD (?)

Although the discussions that eventually led to the CRADA were centered around the improved launcher, the agreement was intentionally written broad enough to allow work in any area of the weapon system. The CRADA is written for a 10-yr duration with the option of extending it for an additional 10 yr. The distribution of responsibilities for the SMAW CRADA is summarized in Table 2. It is important to remember that this work breakdown is what was decided upon for this agreement. Other CRADAs can reach any agreement and the only limitation is that the government cannot provide funding to the CRADA partner.

CRADAs involve a new mindset, a new "paradigm," if you will. Most interactions involve a customer with one side doing the work and the other providing funding. CRADAs are a partnership. This means it is important that both sides benefit for the partnership to be successful. The first step to ensuring this is to plan the CRADA so that both partners benefit. Table 3 summarizes the benefits for the SMAW CRADA. It is important that all decisions that impact the CRADA include the interests of both partners particularly the profit motive for the non-Navy partner.

TABLE 3. CREDA ADVANTAGES

Government	CMS
National Economy Majority of manufacturing in U.S. Substantial foreign sales USMC Improved Launcher completed and qualified Active production line for SMAW System NSWCDD License Fees/Royalties for: Capital Investment Ventures	Excellent weapon system to market for international sales Credibility of association with Government Lab

UNIQUE SITUATION

There were two aspects of this CRADA which created concerns. Foremost was the use of a CRADA on a weapon system. This was a new concept to the Navy. There was an expectation prior to this that CRADAs would be used to develop nonmilitary commercial uses for Navy developed technology. There was nothing in the regulation which required this, but the expectation was there.

Once everyone was satisfied that a CRADA could be for a weapon system, the concern with having such an agreement with a foreign-owned company became an issue. CMS is a wholly owned subsidiary of Deutsche Aerospace, a German company. With their many government contracts, CMS was already set up with a proxy board. No information is transferred between CMS and their parent company without an export license from the Department of State. The counsel for CMS provided ONR with the proxy information used to obtain the facility clearances. With these concerns satisfied, the CRADA was approved.

LICENSING IN THE NAVY

INTRODUCTION

Federal laws, found at 35 USC § 207-209, allow the Navy to transfer rights in Navy-owned inventions covered by patents or patent applications to responsible applicants. It is the policy of the Navy to promote the transfer of Navy technology for commercial application, as long as that transfer would not be detrimental to national security, by licensing, either through an exclusive or a non-exclusive license, inventions arising from Navy-funded R&D. This section will give a brief description of the processes that can be, and were, used at NSWCDD to start negotiations with a potential licensee, the form of license the Navy uses, and what it expects to, and can, receive after granting the license.

GETTING STARTED

Companies interested in doing business with the Navy in selected areas read the Federal Register and contact NSWCDD to discuss license possibilities whenever they see that Dahlgren has filed patent applications in those areas. When the discussions become serious, the company is

required to file a license application with the Office of Patent Counsel. The main components of this license application are the following:

- (1) identification of the potential licensee;
- (2) identification of the inventions;
- (3) a marketing plan showing the amount of anticipated investment of capital by the licensee and commercial value and how the licensee expects to receive that value as revenue through sales or use of the inventions and;
- (4) what amount of money the licensee will pay to start the agreement and how much royalty will be paid upon sales.

When a license application is filed, ONR will publish that fact in the Federal Register. In most instances, a company will want to keep any negotiations or company information as private as possible and may ask the technical office to enter into a confidentiality/nondisclosure agreement to protect such information. Advice of the Office of Patent Counsel is critical in the format of such agreements.

In addition to the above procedure, CMS, as a Navy CRADA partner, was given copies of any patent applications pertaining to the SMAW technology. For this effort, the Patent Counsel had filed 11 patent applications on various inventions of the SMAW launcher and rounds to date during the life of the CRADA, and there were, already in place, six inventions made prior to the CRADA. CMS was very interested in all of these inventions. In keeping with Navy procedure, CMS was required to file a license application in order to start the process. However, because of a clause in the CRADA that gives them an opportunity to obtain an exclusive license to any SMAW invention developed during the life of the CRADA and a non-exclusive license on inventions made prior to the execution of the CRADA, CMS was able to file their license application and have it processed without publication and attendant delays.

THE NAVY PATENT LICENSE

At NSWCDD, a team approach to negotiating the terms of the license is favored. During the early stages of prenegotiations, correspondence between Patent Counsel and the licensee's counsel flowed back and forth, but as the situation started to firm up, it is up to Patent Counsel and management to decide when to form the team. Members on the team are selected individuals from the cognizant technical branch (in this case, G31), Patent Counsel and the Small Business Advocate. A key point to be mindful of, when choosing members of the technical branch, is to include as many as possible of those that worked with the CRADA partner. This ensures that as much as possible of the CRADA history can be relied upon when making specific decisions. At the first team meeting, members were briefed by Patent Counsel on details of the standard Navy patent license and the marketing plan submitted by the licensee.

Typically, a Navy license agreement is a fairly uncomplicated document, as agreements go, and members of the team reviewed the "boilerplate" language to see how to make the license profitable for all concerned. There are fifteen (15) articles or major subdivisions in the license. Briefly, the section titles most often used are: Preamble; Definitions; License Grant; Licensee's Performance; Royalties; Patent Marking and Nonendorsement; Representation and Warranties; Reports; Modifications and Termination; Officials not to Benefit; Notice; Sublicensing; Reservation of Rights; Litigation; and an Appendix. While this publication will not take time to go into details on all sections, some of the more important ones will be highlighted.

As to fees, there is a requirement to pay to the Government a license execution fee and a reasonable royalty on whatever money is made from selling the invention. These amounts may be based on expenses paid by NSWCDD or reasonable amounts paid in the commercial marketplace for similar types of agreements. It is also usual to require a minimum royalty per year.

The license may be, and in this case was, structured so that the licensee may enter into sub-licensing agreements, with Navy approval, if it appears that sublicensing would facilitate commercialization of the licensed products. The Navy insists on a reservation of rights clause that gives the United States and its allies the right to practice the invention royalty-free throughout the world.

Finally, as far as modification and termination and litigation are concerned, the Navy reserves the right to insist that the license be terminated if the licensee is not meeting the marketing plan or if we find that the licensee has made a material false statement or commits a breach of one of the covenants we have in the license agreements. The Navy wants to avoid any litigation that might arise under any of the patents and will stipulate that an exclusive licensee has a right to enforce the licensed patents in court.

LICENSING REVENUES

A major benefit to licensing Navy technology is in the area of revenues. The National Technology Transfer and Advancement Act of 1995, as implemented by the Navy, provides that, each year for each licensed invention, each inventor shall be paid the first \$2,000.00 and shall share equally with other co-inventors 20 percent of the balance of any royalties or other payments remaining after each inventor receives his or her \$2,000.00 (up to \$100,000 total per person per year). The remaining royalties flow to NSWCDD. Under the SMAW CRADA, the policy is that the funding will be returned to the organizational level (Code G31) that generated it.

SPONSOR COOPERATION

One of the key conditions necessary for success in this endeavor was the support of the sponsor. The USMCs Systems Command is the current incarnation of the organization that funded the original developments and is the organization that continues to fund many SMAW and SMAW related efforts.

Support from the sponsor was necessary for a variety of reasons. The most important reason was to ensure that our sponsor, who continues to fund many of the programs that support our personnel, was not opposed to the action we were taking for any reason. Although the development work was done here and the patents were issued to NSWCDD personnel, the SMAW is a Marine Corps weapon system. It would have been inappropriate to make decisions concerning a USMC weapon without the agreement of the USMC.

Sponsor support also went a long way to overcoming many of the obstacles that remained before the CRADA and licensing tasks could be completed. Additionally, funding for many of the tasks planned may be available from a supportive sponsor.

The support of the Marine Corps was strengthened by the use of a Memorandum of Agreement (MOA) that determined the use of funds received through patent licenses. The terms of this MOA provided sixty-five percent (65%) of the funding received by NSWCDD would be dedicated to USMC related efforts. The selection of these efforts will be determined by agreement

between NSWCDD and the USMC. The other thirty-five percent (35%) remains discretionary for NSWCDD. A copy of the MOA is provided as Appendix A.

The use of the MOA provided an easily identifiable benefit to the USMC for support for the efforts surrounding the SMAW system. This agreement also avoids any concerns that NSWCDD would be benefiting unfairly from USMC-funded programs.

PROCESS EVENTS

The process covered by this report includes several separate but related areas. These events are summarized in Figure 1 and described below. Figure 1 is an attempt to graphically illustrate the steps, interrelations, and dependencies inherent in the process events. The shape of the box used for each event ties it to the portion of the process to which it is most directly related. (The key at the bottom of the figure define the shapes.) Many of the events apply to more than one of the parts of the process, but they are keyed to what was felt to be the primary relationship.

CRADA EVENTS

The "C" series (in the rounded boxes) summarize the events surrounding the CRADA.

C1. The first step in the long path to the CRADA was for the NSWCDD and CMS to agree to the general purposes of the partnership, to ensure that it would be a "win-win" arrangement. Discussions at this stage included eventual goals in the area of licenses and marketing. This stage was handled through round table discussions and presentations. It was also during this phase that other contractors with an interest in SMAW were informally approached with the idea of a CRADA on SMAW. The possibility of a CRADA with CMS was not discussed, but rather the idea of a CRADA. No other contractors showed interest in such an agreement.

C2. Once the general framework of the agreement was determined, the actual drafting of the CRADA was begun. In addition to the fact that the SMAW CRADA was a non-standard CRADA, the issue of using a CRADA for developing a weapon system was breaking new ground. For the actual drafting of the CRADA it was necessary for one person to sit down and plow through the information and produce a draft of the document.

C3. The draft then went through a series of review cycles by CMS, the technical office at NSWCDD, the Patent Counsel and the Technology Transfer Office. The Technology Transfer Office and the Patent Counsel were involved before this, but at this point their review became formal.

C4, C5, C6. The CRADA was then submitted to ONR for review. ONR had many concerns that were addressed through a series of discussions and revisions (see discussion below). It is critical to note that CMS was very involved with these iterations. At no point in this partnership did this become a one-sided negotiation. This is not a contract, we are not their customer. Finally ONR was satisfied with the agreement.

C7. With the approval of ONR, the CRADA was forwarded to NSWCDD via NSWC. The CRADA then became effective with signatures by NSWCDD and CMS. A copy of the CRADA is provided in Appendix B.

C8. One of the responsibilities of the government described in the CRADA is to provide technical assistance in the marketing of the SMAW. An important provision is that this is technical assistance, we are not becoming "marketers." Data and hardware will be provided to CMS and/or directly to potential customers to help provide a positive, candid image of the SMAW system.

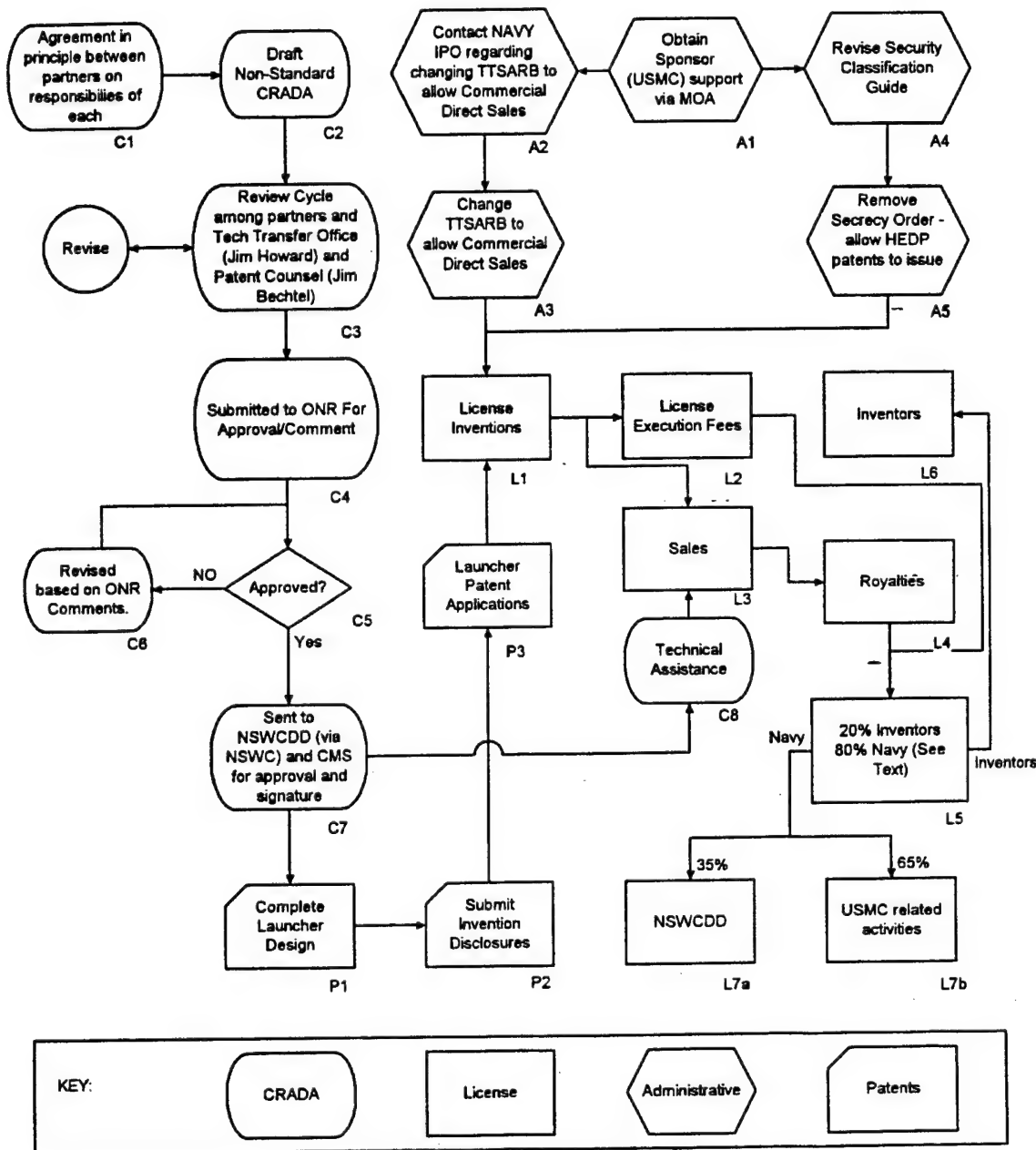


FIGURE 1. PROCESS FLOW CHART

ADMINISTRATIVE EVENTS

The "A" series (hexagon boxes) summarize the activities that we have grouped in the "Administrative" area.

A1. Sponsor support can be considered one of the important elements to the success of this venture. Sponsor support was obtained through a variety of methods discussed below.

A2. The export of munitions is controlled by the Technology Transfer Security Assistance Review Board (TTSARB). The direction put out by this board is the TTSARB Decision Memorandum for the system. Our interface for the TTSARB is through the Navy International Projects Office (IPO). The IPO was contacted to start the process of considering a change to the SMAW TTSARB Decision Memorandum to allow direct commercial sales. Sales other than direct commercial (i.e., Foreign Military Sales or Foreign Military Funding) do not generate royalties.

A3. The TTSARB Decision Memorandum was changed to allow Direct Commercial Sales. The support of the sponsor was important to obtaining this change.

A4. The patents on the SMAW HEDP were held from issuance by a secrecy order. The first consideration was whether it was reasonable to change the classification. The first step in this process was to contact the Information Security group (Code C294). The sponsor was listed as the original classifier, therefore, the recommendation was forwarded by C294 to the USMC. Again, the support of the sponsor was important to our success as a revised security classification guide was issued.

A5. The Patent Counsel used the revised classification guide as a basis for having the secrecy order lifted on the HEDP patents.

PATENT EVENTS

The "P" series of events (rectangular boxes with one corner missing) are the events leading to the patenting of the new launcher inventions.

P1. The completion of the launcher design was necessary to develop the technology that was contained in the patents.

P2. Inventors completed invention disclosure forms and submitted them to the Patent Counsel.

P3. Patent applications were completed and submitted to the U.S. Patent Office. This activity was directed by the Patent Counsel and was supported by the inventors.

LICENSE EVENTS

The "L" series of events (rectangular boxes) summarizes the events leading up to and following the Licensing of the SMAW patents.

L1. The patents were licensed after a long negotiating process that involved government and contractor personnel. The Licenses were signed in a ceremony on 14 March 1997 by Captain Overton, Commander, NSWCDD and Mr. Frank P. Ragano, President and CEO, CMS.

L2. A license execution fee was received at the signing. This fee will be distributed by the same method as the royalties.

L3. CMS will make sales to countries listed in the TTSARB Decision Memorandum and approved by the Department of State.

L4. One of the main goals which has not yet been realized. Royalties will result from the sales of the weapon system.

L5. Royalties will be divided between the inventors and the Navy.

L6. The inventors will receive funding in the form of a check.

L7a & L7b. In accordance with the MOA, the funds received by NSWCDD will be divided with 65% being dedicated to USMC related activities and the other 35% to local discretion.

LESSONS LEARNED

VALUE

Commercial value is determined in the marketplace. The value of technology is the perceived value by our Partner. To obtain maximum value in the marketplace, our Partner must be able to legally gain an advantage over competition. Well-written U.S. Patents give the owner or Licensee a competitive edge in the marketplace.

WIN-WIN-WIN RELATIONSHIP

To be successful, the CRADA and License must present a Win-Win-Win relationship. That means there must be identifiable benefits for NSWCDD, the CRADA partner and for the Sponsor. The benefits are not all monetary.

The CRADA partner has a profit motive that must be recognized. The paradigm of the government as customer that will be catered to must be overcome. Both the CRADA and License are partnerships where the welfare of each partner is intertwined with the other. Actions taken must be to the benefit of both partners.

Obviously NSWCDD must have benefit in order to justify our involvement. The benefits do not have to be the same as were worked out in this example, but there must be a benefit.

INVOLVE THE SPONSOR FROM THE BEGINNING

The Sponsor is the organization that funded the underlying technology that made the CRADA possible. It was particularly important in the case of SMAW because the technology in question is the total system and the system is fielded by the Marine Corps. The Marines have an understandable feeling for ownership. It would have been easy, but inappropriate, not to involve the Sponsor in these negotiations. There is no legal requirement to include the sponsor; only the organization that includes the "inventor" and Office of Naval Research (ONR) have legal roles in licensing the technology.

In SMAW, the approval of the Sponsor was ensured through an Memorandum of Agreement (MOA) that allowed the USMC to derive direct benefits. The USMC then were invaluable in allowing changes to the Security Classification Guide (which allowed the round patents to issue) and the Technology Transfer Security Assistance Review Board (TTSARB) (which allowed the direct commercial sales of the weapons system - critical to the creation of royalties). Additionally,

had we gone forward with an agreement that our sponsor was opposed to, future funding may have been jeopardized.

MISCONCEPTION BETWEEN CRADAS AND LICENSES

A CRADA is an agreement to cooperatively work on research and development of technology to the mutual benefit of both parties. A License is a legal agreement to allow someone to use technology that has been protected by a patent in exchange for some type of consideration, usually a royalty payment. A CRADA must include research and/or development effort. Since a CRADA is not a license, in most cases, there are no royalty payments associated with it. It is possible for the CRADA partner to fund work at the government facility, but this is not a royalty payment.

The only connection is that the CRADA guarantees a royalty-free, non-exclusive license between the partners as inventions made under the CRADA. This does not constitute the license, which is a separate agreement that must be negotiated. An exclusive license requires still more negotiations. An advantage to having the CRADA with CMS was that the application for an exclusive license did not have to be advertised prior to being granted. Normally such a license would have to be advertised in the Federal Register and a 60-day waiting period for the filing of written objections allowed to elapse.

MANAGEMENT SUPPORT

Management has to provide the support to make a CRADA and or a License possible. There is no identifiable source of funding for such an effort, it must be viewed as an investment. There has to be a management and a technical point of contact (POC) identified and dedicated to making this effort a success. Sometimes, only one person must fill both roles. There is a lot of detail work required to make the process work. The POC will need to look at the problem and determine what needs to be done and to prioritize in what order. He will have to become knowledgeable on all of the processes to put everything together. There are many resources available for each step of the process, but someone needs to organize all of the separate elements.

OPEN COMPETITION

With the SMAW CRADA, although CMS contacted us initially, other companies with similar business bases were contacted to see if there was any interest in such an agreement. No other company was interested at the time, so the CRADA was executed. CRADAs are not intended to be a means to avoid competition. It would be reasonable to have a CRADA with more than one company for a given technology.

GENERAL TECH TRANSFER KNOWLEDGE BY THE TECHNICAL REPRESENTATIVE

It is crucial that the technical POC on an endeavor such as this become familiar with the rudiments of the Technology Transfer laws and regulations. The Patent Counsel has a limited staff and cannot become entirely versed in the technical aspects of a system or a CRADA. Many of the decisions made need a certain degree of information about both aspects. Also, the technical POC needs this rudimentary understanding to be able to ask the proper questions of the Patent Counsel and the CRADA Coordination Office.

APPENDIX A

**THE SHOULDER-LAUNCHED MULTIPURPOSE ASSAULT
WEAPON (SMAW) MEMORANDUM OF AGREEMENT (MOA)**

**Memorandum of Agreement
between
the Naval Surface Warfare Center Dahlgren Division (NSWCDD)
and
the Marine Corps Systems Command (MARCORSYSCOM)
Covering
Royalties Resulting From Sales of the Shoulder-Launched
Multi-Purpose Assault Weapon (SMAW)**

Purpose

This agreement ensures that a substantial percentage of royalties received through the direct commercial sale of the SMAW system will be used in support of United States Marine Corps (USMC) priorities. The royalties discussed in this agreement include those received on the USMC system and any improvements developed under the Cooperative Research And Development Agreement (CRADA) between NSWCDD and CMS, Inc.

Background

In December of 1994, a Cooperative Research And Development Agreement was signed between NSWCDD and CMS, Inc. to perform cooperative and mutually beneficial research and development. This CRADA is to enable future investment by NSWCDD and CMS, Inc. to develop improvements to the SMAW which has the potential for foreign sale.

The SMAW system was developed by NSWCDD under the sponsorship of the USMC. The Mk 153 Mod 0 Launcher, the High Explosive Dual Purpose (HEDP), the High Explosive Anti Armor (HEAA) and the Common Practice Rounds were developed under USMC sponsorship. There are two patents held by NSWCDD on the HEDP round.

An improved SMAW launcher development was begun under USMC sponsorship but canceled prior to completion. The improved launcher (Mk 153 Mod 1) development was completed under the CRADA. There are 9 patent applications by NSWCDD associated with this development and an additional 6 NSWCDD patent applications related to the SMAW system.

The CRADA provides an avenue for licensing, but it is the patents that actually are licensed. These licenses are the vehicle that actually provide the royalties. It is anticipated that CMS will purchase exclusive licenses to all improvements developed under the CRADA. It is also anticipated that CMS and several contractors will want to purchase licenses for the High Explosive Dual Purpose (HEDP) round. (The HEDP is the only part of the existing system that is patented.) All commercial direct sales of the licensed portions of the SMAW system, regardless of the contractor, will result in royalties returned to NSWCDD.

Agreement

The royalties received by NSWCDD resulting from sales of the SMAW system will be allocated as follows:

Allocation	Percentage
USMC priority efforts	65
NSWCDD discretionary	35
Total	100

These royalties are limited to what are actually received by NSWCDD. Disbursements to individuals will be made prior to receipt by NSWCDD.

The distribution of the funding allocated to USMC efforts shall be mutually agreed upon by MARCORSYSCOM Program Manager for Ground Weapons and NSWCDD Guns and Munitions Division.

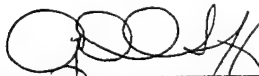
NSWCDD will provide an Annual Summary Report to MARCORSYSCOM for years during which royalties are received. This report will document all financial records and will summarize the work performed in support of USMC priorities. Copies of financial reports received under terms of the licenses will be sent to MARCORSYSCOM within two weeks of receipt.

The duration of this agreement shall be ten years.



Mr. Paul Credle, Head Weapons System Department,
Naval Surface Warfare Center Dahlgren Division

11/9/95
Date



Colonel G. Dockendorf, Code CBG,
Marine Corps System Command,

13 Nov 95
Date

APPENDIX B

**THE SHOULDER-LAUNCHED MULTIPURPOSE ASSAULT WEAPON
(SMAW) COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT
(CRADA)**

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Cooperative Research and Development Agreement
between
NSWCDD
and
CMS

Article 1. INTRODUCTION

Under authority of the Federal Technology Transfer Act of 1986 (Public Law 99-502, 20 October 1986), the Naval Surface Warfare Center Dahlgren Division (NSWCDD) and CMS, Incorporated, whose corporate headquarters are located at Tampa, Florida, do hereby agree and do enter into this COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT, which shall be binding upon both Partners and their assigns according to the clauses and conditions hereof and for the term and duration set herein.

Article 2. SUMMARY

The Shoulder-launched Multi-purpose Assault Weapon (SMAW) consists of a launcher and a family of rockets. The SMAW Launcher, High Explosive Dual Purpose (HEDP) rocket and Common Practice Round (CPR) completed production in 1987. The High Explosive Anti-Armor (HEAA) is currently in production. This agreement provides the opportunity for foreign and domestic sales by the non-government partner (CMS). In addition, a new and improved launcher will be developed by the CRDA partners and provided for sale by CMS. This Lightweight Launcher will be based on a design initiated (but never completed) under a United States Marine Corps (USMC) program. Additional system improvements will be investigated and incorporated, if appropriate.

As described in this document, NSWCDD shall complete the design of the new launcher, provide technical advice during fabrication and assembly, provide interface with the USMC, obtain the approval of the Navy Weapon System Explosive Safety Review Board (WSESRB) and provide technical support to the marketing effort. CMS shall provide fabrication of development hardware, Developmental Testing (DT), full-scale production and marketing.

As a result of this agreement a true "win/win" relationship results. The benefits to the government include the royalties from the sales, the completion and qualification of an improved launcher design and the establishment of an active SMAW system production line. The existence of an active production line will allow the USMC to purchase additional SMAW components (including the Lightweight Launcher) without having to pay the startup costs. There are also the unit cost advantages associated with the larger volume of production. The benefits for CMS include the receipt of the current SMAW Technical Data Package (TDP), an improved launcher that will be more desirable on the world market, the credibility

of an association with a U.S. Military Laboratory in development and assistance in marketing and production.

Article 3 BACKGROUND

The Federal Technology Transfer Act of 1986, as amended, provides for making Federal laboratories' developments accessible to private industry, and to state and local governments, and for the improvement of the economic, environmental and social well-being of the United States by stimulating the utilization of Federally-funded technology developments.

NSWCDD was the lead government laboratory in the invention and development of the fielded SMAW system and was the designer of the improved launcher, a development that was not completed. NSWCDD has the expertise to complete the development of the Lightweight Launcher and to support the transition of the current TDP to production.

CMS has performed extensive work in the components of similar systems (Sidewinder, Javelin, Hellfire II, Maverick and Hydra 70) and desires to work with NSWCDD to complete the development of the Lightweight Launcher and to produce the system for Foreign Military Sales (FMS) or direct commercial sales.

In consideration of the mutual promises contained in this Agreement and for other good and valuable consideration, the Partners agree as follows:

Article 4 DEFINITIONS

As used in this Agreement, the following terms shall have the following meanings and are equally applicable to both singular and plural forms of the terms defined:

4.1 "Agreement"

means this Cooperative Research and Development Agreement (CRADA or CRDA).

4.2 "Cooperative Research"

means research performed under this Agreement pursuant to the objectives, scope and responsibilities by NSWCDD or CMS working alone or together.

4.3 "Data"

means all recorded information of any kind of a scientific or technical nature, regardless of the form or method of the recording.

4.4 "Government"

means the Government of the United States of America.

4.5 "Government Purpose License Rights"

(GPLR) means the right to use, duplicate, or disclose Data, in whole or in part and in any manner, for Government purposes only, and to have or permit others to do so for Government purposes only. Government purposes include competitive procurement, but do not include the right to have or permit others to use data for commercial purposes.

4.6 "Invention"

means any invention or discovery which is or may be patentable under Title 35 of the United States Code.

4.7 "Made"

when used in relation to any invention means the conception or first actual reduction to practice of such Invention.

4.8 "Patent Application"

means a U.S. or foreign patent application, continuation, continuation-in-part, divisional, reissue and/or reexamination on any Subject Invention.

4.9 "Proprietary Information"

means information which embodies trade secrets developed at private expense or which is confidential business or financial information provided that such information:

(a) is not known or available from other sources without obligations concerning its confidentiality;

(b) has not been made available by the owners to others without obligation concerning its confidentiality;

(c) is not already available to the Government without obligation concerning its confidentiality; and,

(d) has not been developed independently by persons who had no access to the Proprietary Information.

4.10 "Restricted Access Information"

means Subject Data for which the Partners mutually agree that a Government Agency may provide appropriate protection, under Title 15 U.S.C. Section 3710a (c) (7) (B), against dissemination for a period of up to five (5) years after development of the information in an activity conducted under Title 15 U.S.C. Section 3710a, provided the information would be Proprietary Information if the information had been obtained from a non-Federal Party.

4.11 "Subject Data"

means all Data first produced in the performance of the Agreement.

4.12 "Subject Invention"

means any Invention Made in the performance of work under this Agreement.

4.13 "Unlimited Rights"

means the right to use, duplicate, release or disclose Data or Computer Software in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to do so.

Article 5 OBJECTIVES

The objectives of this CRADA are summarized below.

- (a) Develop and transition to production the SMAW Lightweight Launcher. This endeavor will require the completion of the design and drawings, testing (Developmental, Safety, and Operational), WSESRB approval and production.
- (b) Develop and transition to production a new SMAW spotter round with acceptable ballistics and lower production costs.
- (c) Successful transfer of the current SMAW TDP to CMS. Success is defined by the successful production of the current SMAW system by CMS, with or without (a) or (b).
- (d) Government supported marketing effort that will ensure the maximum permissible markets for the SMAW system.
- (e) Investigate and incorporate other system improvements, as appropriate.

Article 6 SCOPE AND RESPONSIBILITIES**6.1 Scope**

As agreed herein, the Government, through NSWCDD, provides personnel, facilities, and equipment (but not funds) to the Agreement. CMS provides personnel, facilities, and equipment. Although it is not planned for CMS to provide funds to NSWCDD, this option shall remain within the scope of the Agreement. The resources provided by each Partner shall be appropriate and adequate to accomplish the objective and scope of the Agreement as spelled out in the Statement of Work. It is understood that the nature of the Cooperative Research performed under this Agreement is such that completion within the period of performance

specified or within the limits of financial support allocated cannot be guaranteed by either Partner. Accordingly, it is agreed that all Cooperative Research performed under this Agreement is to be performed on a best-effort basis.

6.2 Responsibilities

6.2.1 Government Personnel, Facilities and Equipment

NSWCDD shall complete the design of the Lightweight Launcher and provide CMS drawings suitable for production. NSWCDD shall support the fabrication and assembly process for the Lightweight Launcher and other elements of the SMAW system by making personnel available in an advisory capacity. NSWCDD shall support the Lightweight Launcher by seeking WSESRB approval for the design and USMC support for Operational Testing. The Government shall provide and maintain the SMAW Technical Data Package (TDP). NSWCDD shall provide technical support of CMS's marketing effort to the degree to which funding may be available. In accordance with Article 13.2.9, NSWCDD will not directly or indirectly endorse any CMS product.

6.2.2 CMS Personnel, Facilities and Equipment

CMS shall provide for all fabrication and assembly of developmental hardware for the Lightweight Launcher. CMS shall be responsible for all Developmental Testing (including environmental and safety qualification testing). CMS shall be responsible for marketing with NSWCDD support as defined in Article 6.2.1. CMS shall be responsible for all elements of full-scale production. CMS shall be responsible for all new or modified documentation except for the TDP.

Article 7 REPRESENTATIONS AND WARRANTIES

7.1 Representations and Warranties of NSWCDD

NSWCDD hereby represents and warrants to CMS as follows:

7.1.1 NSWCDD is a Federal "laboratory," as defined in Title 15 U.S.C. Section 3710a (d) (2) (A), of the U.S. Navy, and is wholly owned by the Government, whose substantial purpose is the performance of research, development, or engineering by employees of the Government.

7.1.2 The performance of the activities specified by this Agreement is consistent with the mission of NSWCDD.

7.1.3 All prior review and approvals required by law or regulations have been obtained by NSWCDD prior to the execution of this Agreement. The Official executing this Agreement has the requisite authority to do so.

7.1.4 Except as otherwise provided in this Agreement, NSWCDD makes no express or implied warranty as to the conditions of research or any Invention or product,

whether tangible or intangible Made or developed under this Agreement, or the merchantability, or fitness for a particular purpose of the research or any Invention or product.

7.2 Representations and Warranties of CMS

CMS hereby warrants and represents to NSWCDD as follows:

- 7.2.1 CMS, as of the date hereof, is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware.
- 7.2.2 CMS has the requisite power and authority to enter into this Agreement and to perform according to the terms thereof.
- 7.2.3 The Board of Directors and stockholders of CMS have taken all actions required to be taken by law, its Certificate or Articles of Incorporation, its bylaws or otherwise, to authorize the execution and delivery of this Agreement.
- 7.2.4 The execution and delivery of this Agreement does not contravene any material provision of, or constitute a material default under any material agreement binding on CMS or any valid order of any court, or any regulatory agency or other body having authority to which CMS is subject.
- 7.2.5 CMS is not presently subject to debarment or suspension by an agency of the Government. Should CMS be debarred or suspended, CMS will so notify NSWCDD, who may elect to terminate the Agreement.
- 7.2.6 CMS is a foreign-owned, controlled or influenced (FOCI) organization as such terms are defined in DoD 5220.22-R (Industrial Security Regulations). CMS is owned by a German company.
- 7.2.7 CMS is not a small business as defined in 15 U.S.C. Section 632 and implementing regulations (13 C.F.R. Section 121.101 et seq.) of the Administrator of the Small Business Administration. In simplest terms, this means fewer than 500 employees (see 13 C.F.R. Section 121.601).

Article 8 FUNDING

In support of the basic requirements of this Agreement, each Partner will be responsible for its own costs. CMS may provide funding to NSWCDD for efforts beyond the minimums of the Agreement, but still within the scope of Agreement. (An example would be technical support of marketing efforts beyond that for which NSWCDD has funding).

8.1 Payment Schedule

Payment shall be as negotiated for each specific effort. Funding must be received prior to completion of the effort.

Checks will be made out to: Naval Surface Warfare Center Dahlgren
Division

Checks will be mailed to: Commander
Dahlgren Division, (Code M11)
Naval Surface Warfare Center
17320 Dahlgren Rd.
Dahlgren, VA 22448-5100

8.2 Insufficient and Excess Funds

NSWCDD may discontinue performance of the negotiated effort under this Agreement if the funds provided by CMS for performance by NSWCDD are insufficient to cover NSWCDD's costs for such performance. Advanced funds not expended by NSWCDD upon completion of the negotiated effort or termination of the Agreement shall be returned to CMS upon NSWCDD's submission of a final fiscal report to CMS.

8.3 Accounting Records

NSWCDD shall maintain current accounts, records and other evidence supporting all its expenditures chargeable to CMS under this Agreement and shall retain such records for at least twelve (12) months after the completion or termination of this Agreement. NSWCDD shall provide CMS a report within four (4) months after completing performance under this Agreement.

Article 9 REPORTING AND PUBLICATIONS

9.1 CMS Reports

CMS shall submit a final summary report of its results, including all Subject Inventions, to NSWCDD within four months after completing its performance under this Agreement. CMS shall provide a written Test Plan prior to each test. CMS shall provide a written Test Report at the completion of each test. CMS shall make available to NSWCDD, to the extent reasonably requested, Subject Data produced by CMS in sufficient detail to explain the progress of work under this Agreement. CMS shall submit Engineering Change Proposals (ECPs) as required during the course of this Agreement.

9.2 NSWCDD Reports

NSWCDD shall make available to CMS, to the extent reasonably requested, Subject Data produced by NSWCDD in sufficient detail to explain the progress of work under this Agreement.

9.3 Agreement to Confer Prior to Publication or Presentation

NSWCDD and CMS agree to confer and consult prior to the publication or presentation of Subject Data to assure that no Proprietary Information is released and that patent rights are not jeopardized. Prior to submitting a manuscript for review which contains the results of the research under this Agreement, or prior to publication if no such review is made, each Partner shall be offered an ample opportunity to review such proposed publication and to file Patent Applications in a timely manner, if it is so entitled under this Agreement.

9.4 Classified or Militarily Critical Technologies (MCT) information

All publications and presentations by CMS of Subject Data must be unclassified material and must be cleared by NSWCDD for public release prior to presentation or publication to ensure that no classified, MCT, or otherwise restricted information is included.

Article 10 INTELLECTUAL PROPERTY**10.1 Subject Data and Proprietary Information: Ownership, Rights, and Use****10.1.1 Ownership and Rights in Data and Delivery of Subject Data**

Each Partner shall have title to Subject Data generated by that Partner. Each Partner, upon request to the other Partner, shall have the right to review and to request delivery of all Subject Data and delivery shall be made to the requesting Partner within two weeks of the request. CMS grants to the Government and Government shall have Unlimited Rights in any Subject Data generated by CMS which is not Proprietary Information of CMS and CMS shall have Unlimited Rights in all Subject Data generated by NSWCDD. Each Partner will hold in confidence and treat as company Proprietary Information all Restricted Access Information for a period up to five years, as mutually agreed between the partners. In accordance with 15 U.S.C. Section 3710a (c) (7) (B), Restricted Access Information will be protected by NSWCDD from release under the Freedom of Information Act (FOIA), 5 U.S.C. Section 552.

10.1.2 Protection and Uses of Subject Data and Proprietary Information**10.1.2.1 Protection from Release under FOIA**

Subject Data which is Proprietary Information of CMS is the property of CMS and shall be protected by NSWCDD from release under the FOIA for as long as the Data meets the definition of Proprietary Information. NSWCDD may release other CMS Subject Data where such release is required pursuant to a request under the FOIA (5 U.S.C. Section 552). NSWCDD shall notify CMS promptly of any such request for release of CMS Subject Data.

10.1.2.2 Government Purpose License Rights in Subject Data that is Proprietary Information

The Government shall have Government Purpose License Rights in any Subject Data Proprietary Information furnished by CMS to NSWCDD under this Agreement. CMS shall place a proprietary notice, in accordance with Article 10.1.3, on all Subject Data it delivers to NSWCDD under this Agreement which it asserts is Proprietary.

10.1.2.3 Rights in Proprietary Information that is not Subject Data

NSWCDD agrees that any Proprietary Information that is not Subject Data and is furnished by CMS to NSWCDD under this Agreement shall be used, reproduced and disclosed by NSWCDD only for the purpose of carrying out this Agreement, unless consent to other use or release is obtained from CMS. CMS shall place a proprietary notice, in accordance with Article 10.1.3, on all non-Subject Data it delivers to NSWCDD under this Agreement which it asserts is Proprietary.

10.1.3 Marking and Determination of Proprietary and Restricted Access Information

In accordance with 10.1.1 and 10.1.2, CMS shall place a proper Proprietary notice on each page of all Data it delivers to NSWCDD under this Agreement which CMS asserts is Proprietary Information. Restricted Access Information will be marked in a manner similar to the following:

"RESTRICTED ACCESS INFORMATION - TREAT AS PROPRIETARY TO CMS"

NSWCDD will review all such designated Proprietary and Restricted Access Information and, in consultation with CMS, will determine whether it qualifies as "Proprietary or Restricted Access Information" in accordance with the criteria of Articles 4.9 and 4.10.

10.2 Copyrights**10.2.1 Copyright by CMS**

CMS may copyright and place a copyright notice on works of authorship prepared pursuant to this CRADA that may be copyrighted under Title 17, U.S. Code.

10.2.2 Copyright License to Government

CMS hereby grants a nonexclusive, nontransferable, irrevocable, royalty-free copyright license throughout the world in the exclusive rights in copyrighted works of authorship prepared pursuant to this Agreement to the Government for Government purposes, including the right to permit others to use this license for Government purposes.

10.2.3 Copyright Statement

On any work copyrighted pursuant to 10.2.1, CMS shall include the following statement on any mask work or work of authorship created in the performance of this Agreement:

"The U.S. Government has a copyright license in this work pursuant to a CRADA with CMS."

10.3 Patents: Reporting, Rights, Filing, Licenses**10.3.1 Reporting of Inventions**

Each Partner shall require their employees to file invention disclosures describing any Subject Invention with their respective personnel responsible for patent matters within ninety (90) days from the date the Subject Invention is Made. Each partner shall, in writing, promptly provide to the other Partner a copy of the invention disclosure describing any Subject Invention made by one or more of its employees. The invention disclosure shall be sufficiently complete so that the receiving Partner may evaluate the Subject Invention to determine its operation, component parts, steps of implementation, uses, and potential patentability. For the purposes of Article 10.3.1, "promptly" means within ninety (90) days from receipt of a complete invention disclosure by its patent personnel or no later than 45 days before a statutory bar date, whichever is earlier.

10.3.2 Subject Inventions made Solely by CMS Employees

NSWCDD agrees that CMS retains title in a Subject Invention Made solely by CMS employees. CMS agrees to timely file Patent Applications in accordance with 10.3.5 on such Subject Invention at its own expense. CMS hereby grants to the Government, a nonexclusive, irrevocable, paid-up license in any Subject Invention made solely by CMS employees, to practice or have practiced the Invention throughout the world by or on behalf of the Government. CMS shall provide to NSWCDD a written instrument, prepared in a form satisfactory to NSWCDD, confirming such license rights to the Government.

10.3.3 Subject Inventions made Solely by Government Employees

CMS agrees that NSWCDD retains title in any Subject Invention Made solely by NSWCDD employees. NSWCDD agrees to timely file Patent Applications in accordance with 10.3.5 on such Subject Invention at its own expense. NSWCDD hereby grants to CMS, a nonexclusive, irrevocable, paid-up license in any Subject Invention Made solely by NSWCDD throughout the world by or on behalf of CMS. NSWCDD hereby grants, in any Subject Invention Made solely by Government employees, to CMS, an option to obtain a royalty-bearing exclusive or partially exclusive license as set out in Article 10.3.10. NSWCDD shall provide to CMS a

written instrument, prepared in a form satisfactory to CMS, confirming such license rights to CMS.

10.3.4 Subject Inventions Made Jointly by CMS Employees and Government Employees

Each partner has title, in the form of an undivided interest, to any Subject Invention made jointly by employees of the Government and CMS based on his employees contribution to the Making of the Subject Invention. Each partner hereby grants to the other Partner, in any joint Subject Invention, a nonexclusive, irrevocable, paid-up license to practice or have practiced the Invention throughout the world by or on behalf of the other Partner. NSWCCD hereby grants, in any joint Subject Invention Made, to CMS, an option to obtain a royalty-bearing exclusive or partially exclusive license in the title (undivided interest) of NSWCCD as set out in Article 10.3.10. Each nonexclusive license shall be evidenced by a license agreement prepared by the Partner granting the nonexclusive license to the Partner receiving the nonexclusive license. Each nonexclusive license shall be prepared by the granting Partner in a form satisfactory to the receiving Partner.

10.3.5 Election to File Patent Applications

The Partner (Partner A in this article) having the right to retain title and file patent Applications on a specific Subject Invention may elect to file Patent Applications thereon provided Partner A so advises the other Partner (Partner B in this article) within ninety (90) days from the date Partner A reports the Subject Invention to Partner B. Thereafter, Partner B may elect to file Patent Applications on such Subject Invention if Partner A has not advised Partner B of its election to file and Partner A agrees to assign Partner A's right, title, and interest in such Subject Invention to Partner B subject to Partner A's retention of a nonexclusive, irrevocable, paid-up license to practice or have practiced the Subject Invention throughout the world; and Partner A shall cooperate with Partner B in the preparation and filing of Patent Applications thereon. In the event both Partners decline to file a Patent Application, both Partners shall renounce their entitlement and leave all rights with the inventors, subject to reservation to the Government and to CMS of the license described in the preceding sentence. For Subject Inventions made jointly, as covered in Article 10.3.4, CMS shall be considered Partner A, NSWCCD shall be considered Partner B.

10.3.6 Assignment and Transfer

No Subject Invention described in 10.3 shall be assigned, licensed, or otherwise disposed of, except to the successor of that part of CMS's business to which such license pertains.

10.3.7 Power to Inspect

Each Partner that files a Patent Application on any Subject Invention grants to the other partner the power to inspect and make copies of any Patent Application or Patent Application files on such Subject Invention.

10.3.8 Assistance and Cooperation

Each partner agrees to provide the other with all reasonable assistance in obtaining patent protection and preparing and prosecuting any Patent Application filed by the other Partner, and shall cause to be executed licenses, powers to inspect and to make copies, and all other instruments and documents as the other Partner may consider necessary or appropriate to carry out the provisions of this Article. The Partner filing a Patent Application on any Subject Invention shall, within six months of the filing date of the application, provide to the other partner a copy of and the serial number of each such Patent Application.

10.3.9 Patent Costs

It is agreed that the Partner that prepares, files, prosecutes, and/or maintains and Patent Applications and/or patents on jointly owned Subject Inventions shall bear all the costs of doing so.

10.3.10 Exclusive or partially Exclusive License

Within 90 days of the filing of a Patent Application on a Subject Invention made either solely by Government employees or jointly by employees of the Government and CMS, CMS shall, if desired and in writing to NSWCDD, exercise its option for a royalty-bearing exclusive or partially exclusive license described in Articles 10.3.3 and 10.3.4. If the option is not exercised within the 90 days, the option is automatically revoked and can no longer be exercised. If CMS does exercise its option, the terms and conditions of the exclusive or partially exclusive license shall be negotiated within 180 days of the filing of the Patent Application on a Subject Invention. The terms and conditions shall be in writing and signed by both Partners. The exclusive or partially exclusive license shall be prepared and executed promptly. No license will exist until the license is prepared and executed.

Article 11 PROPERTY***11.1 Title to Pre-Existing Facilities and Equipment***

Each Partner shall retain title to all its pre-existing property, facilities, equipment or other resources provided under the Agreement.

11.2 Items Paid For by Partners

Each Partner shall retain title to all property, facilities, equipment or other resources which they purchased. Property purchased by the Government with CMS's funds shall be Government property.

11.3 Title to Developed or Acquired Equipment

All equipment developed or acquired under this Agreement shall be the property of the developing or acquiring Partner. Jointly developed equipment having components provided by both Partners shall be the property of the Government. Jointly developed equipment having all components provided by CMS shall be the property of CMS.

11.4 Property Costs

During the period of and upon completion of this Agreement, each Partner shall be responsible for all costs of maintenance, removal, storage, repair, and shipping of all equipment to which it retains title.

11.5 Disposal of Property

Disposal of property will be in accordance with applicable disposal laws and regulations.

Article 12 LIABILITIES**12.1 Government Liability for CMS Property**

The Government's responsibility for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the Government while acting within the scope of his office or employment will be in conformance with the Federal Tort Claims Act (28 U.S.C. Section 2671 et seq.). Except as provided by the Federal Tort Claims Act, the Government shall not be liable to CMS for any claims whatsoever, including loss of revenue, profits, or other indirect or consequential damages.

12.2 Indemnification by CMS

CMS holds the Government harmless and agrees to indemnify the Government for all liabilities, claims, demands, damages, expenses, and losses of any kind arising out of the performance by CMS or other entity acting on behalf of or under the authorization of CMS under this Agreement.

12.3 Force Majeure

No Partner shall be liable for the consequences of any unforeseeable force majeure event that (1) is beyond its reasonable control, (2) is not caused by the fault or

negligence of such Partner, (3) causes such Partner to be unable to perform its obligations under this Agreement and (4) cannot be overcome by the exercise of due diligence. In the event of the occurrence of a force majeure event, the Partner unable to perform shall promptly notify the other Partner(s). It shall further pursue its best efforts to resume as quickly as possible and shall suspend performance only for such period of time as is necessary as a result of the force majeure event.

Article 13 GENERAL PROVISIONS

13.1 Characteristics of the Agreement

13.1.1 Entire Agreement

This Agreement, with a statement of work if included, constitutes the entire agreement between the Partners concerning the subject matter hereof and supersedes any prior understanding or written or oral agreement relative to said matter.

13.1.2 Severability

The illegality or invalidity of any provisions of this Agreement shall not impair, affect or invalidate the other provisions of this Agreement.

13.1.3 Headings

Titles and headings of the sections and subsections of this Agreement are for convenience of reference only and do not form a part of this Agreement and shall in no way affect the interpretation thereof.

13.2 Agreements Between Partners

13.2.1 Governing Laws

The Partners agree that United States Federal Law shall govern this Agreement for all purposes.

13.2.2 Independent Contractors/Entities

The relationship of the Partners to this Agreement is that of independent contractors and not as agents of each other or as a joint venture or business partners. Each Partner shall maintain sole and exclusive control over its personnel and operations.

13.2.3 Amendments

If any Partner desires a modification in this Agreement, the Partners shall, upon reasonable notice of the proposed modification by the Partner desiring change, confer in good faith to determine the desirability of such modification. Such modification shall not be effective until a written amendment is signed by the Agreement signatories or their successors.

13.2.4 Assignment/Subcontracting

13.2.4.1 If either Partner subcontracts or grants to a third Part any portion of the work to be accomplished under this Agreement, then the contracting Partner shall remain fully responsible for that portion of the work, and the subcontractor is not a Partner to the Agreement.

13.2.4.2 Except as otherwise provided in this Agreement, this Agreement and any license thereunder shall not be assigned or otherwise transferred by any Partner without the prior written consent of the other Partner, except to the successor of that part of CMS's business to which this Agreement or such license pertains.

13.2.4.3 CMS, Inc. is owned by a German company. Germany permits and encourages United States agencies, organizations, or persons to enter into cooperative research and development agreements, has policy to protect the United States intellectual property rights and has adequate measures to prevent the transfer of strategic technology to destinations prohibited under national security export controls through international agreements to which the United States and Germany are signatories. As a result, there are no limitation on exclusive or partially exclusive licenses with CMS. In the event that CMS or its successors or assignees shall become, during the term of this Agreement, a foreign-owned, controlled, or influenced (FOCI) organization (as such terms are defined in DoD 5220.22-R (Industrial Security Regulations)) based in a country other than Germany, then CMS shall immediately notify NSWCDD to that effect. If the FOCI country of origin for CMS changes during the term of this Agreement, NSWCDD, after consultation with the U.S. Trade Representative in accordance with Section 4 of Executive Order 12591, may cancel any exclusive or partially exclusive licenses of patents in Subject Inventions to which the Government has title, and which have been licensed under this Agreement.

13.2.5 Termination

13.2.5.1 *Termination by Mutual Consent.* CMS and NSWCDD may elect to terminate this Agreement at any time by mutual consent. In such event the Partners shall specify the disposition of all Subject Inventions and other results of work accomplished or in progress, arising from or performed under this Agreement, and they shall specify the disposal of all property in a

manner consistent with this Agreement, any license hereunder and the property disposal laws and regulations.

13.2.5.2 *Unilateral Termination.* Either Partner may unilaterally terminate this entire Agreement at any time by giving the other Partner written notice, not less than thirty (30) days prior to the desired termination date. If CMS unilaterally terminates this Agreement, any exclusive, or partially exclusive, license entered into by the Partners shall be simultaneously terminated unless the Partners agree to retain such exclusive or partially exclusive license.

13.2.5.3 *No New Commitments.* NSWCDD shall make no new commitments after receipt of a written termination notice from CMS and shall, to the extent practicable, cancel all outstanding commitments by the termination date.

13.2.6 Notices

All notices pertaining to or required by this Agreement shall be in writing and shall be signed by an authorized representative and shall be delivered by hand or sent by certified mail, return receipt requested, with postage prepaid, addressed as follows:

If to CMS:	CMS, Inc. 4904 Eisenhower Boulevard Suite 310 Tampa, FL 33634
If to NSWCDD	Commander Dahlgren Division, (Code G31) Naval Surface Warfare Center 17320 Dahlgren Rd. Dahlgren, VA 22448-5100

13.2.7 Disputes

13.2.7.1 *Settlement.* NSWCDD and CMS agree to use all reasonable efforts to reach a fair settlement of any dispute. If such efforts are unsuccessful, remaining issues in dispute will be referred to the signatories or their successors for resolution. If a dispute continues, the remaining issues may be submitted to the Chief of Naval Research, or his designee, for resolution. Nothing in this Agreement is intended to prevent CMS from pursuing disputes in a Federal Court of competent jurisdiction.

13.2.7.2 *Continuation of Work.* Pending the resolution of any dispute or claim pursuant to this Article, the Partners agree that performance of the obligations under this Agreement shall be diligently pursued.

13.2.8 Waivers

None of the provisions of this Agreement shall be considered waived by either Partner unless such waiver is given in writing to the other Partner. The failure of either Partner to insist upon strict performance of any of the terms and conditions hereof, or failure or delay to exercise any rights provided herein or by law shall not be deemed a waiver of any right of either Partner hereto.

13.2.9 Use of Name or Endorsements

CMS shall not use the name of NSWCDD or any other Government entity on any product or service which is directly or indirectly related to either this Agreement or any patent license or assignment associated with this Agreement without prior approval of NSWCDD. By entering into this Agreement, NSWCDD does not directly or indirectly endorse any product or service provided, or to be provided, by CMS, its successors, assignees, or licensees. CMS shall not in any way imply that this Agreement is an endorsement of any such product or service.

13.3 Disposal of Toxic Wastes

Each Partner shall be responsible for the removal of any and all toxic or other material that is used, provided, or generated in the course of performing this Agreement. Each Partner shall obtain at its own expense all necessary permits and licenses as required by local, state, and federal law and shall conduct such removal in a lawful and environmentally responsible manner.

13.4 Officials Not to Benefit

No member of or delegate to the United States Congress shall be admitted to any share or part of this Agreement or to any benefit that may arise therefrom.

13.5 Substantial Manufacture in U.S.

CMS agrees that any products, processes or services using intellectual property arising from the performance of this Agreement shall be manufactured substantially in the United States.

13.6 Public Release of this Agreement Document

This Agreement document is releasable to the public.

Article 14 EFFECTIVE DATE AND DURATION

14.1 This Agreement shall enter into force on the date of the last signature of the Partners.

NCRADA-NSWCDD-95-008

14.2 This Agreement shall terminate 10 years after its effective date. The Agreement may be renewed for an additional 10 years at that time by signature of the Partners.

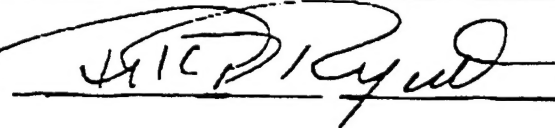
Article 15 SURVIVING PROVISIONS

The articles covering Definitions, Reporting and Publications, Intellectual Property, Property, Funding, Liabilities, General Provisions, and Surviving Provisions shall survive the termination of this Agreement.

Article 16 SIGNATURES

Entered into

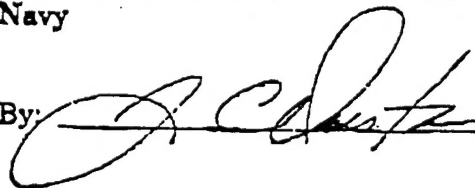
This 19 day of December 1994, for CMS

By: 

Name: FRANK P. RAGANO

Title: President and CEO, CMS, Inc.

This 19 day of DECEMBER 1994, for the Department of the Navy

By: 

Name: JOHN C. OVERTON, CAPT, USN

Title: COMMANDER, NAVAL SURFACE WARFAKE CENTER, DAHLGREN DIVISION

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